



MSA Biological Surveys, Research, and Testing for the Massachusetts Division of Fisheries and Wildlife

2015 Breeding Bird Surveys for the Biodiversity Initiative

Introduction

The Division of Fisheries & Wildlife (DFW) Biodiversity Initiative (BDI) was established under the 1996 Open Space Bond Bill to address the long-term decline of early-successional habitats and associated wildlife species in the Commonwealth. The BDI identifies priority sites for reclamation to early-successional (i.e. grassland or herb/shrub) habitats through large-scale tree/shrub mowing and chipping operations, invasive plant control, and prescribed burning. DFW monitors the effects of current management practices to determine if benefits accrue to target species of conservation need. Knowledge gained from biomonitoring such as breeding bird surveys assists in determining and adapting future management practices.

As a qualified vendor under the Master Service Agreement for “Biological Surveys, Research, and Testing for the Massachusetts Division of Fisheries and Wildlife,” you are invited to bid on this work.

To be considered a qualified vendor under the Master Service Agreement for “Biological Surveys, Research, and Testing for the Massachusetts Division of Fisheries and Wildlife” for this opportunity, all specifications and forms listed in the Biological Surveys area of the website MUST be submitted on or before the due date for this specific opportunity.

Contract Information

Survey Locations & Description: At the sites listed in Table 1, breeding bird surveys will be conducted using the attached protocols (See Appendix I). Some sites have relatively convenient vehicular access, while others involve short hikes to reach the survey site (See Appendix II for directions to sites). Site maps are available as a separate .pdf file upon request.

Table 1. 2015 Breeding Bird Survey Sites

Site	Town	# of Survey Points	Year of abandonment or last mowing
Western District			
Fox Den WMA	Worthington	4	Aspen regeneration & abandoned orchard reclamation in 2006
Eugene Moran WMA	Windsor	7	Mowed in 2011, grassland mowed annually
Farmington River WMA	Otis	8	About 25-30 ac of a 54 acre harvest completed in winter 2014/2015 (5 points), plus potential sites nearby for future management (3 points).
Stafford Hill WMA, Barn	Cheshire	5	Matrix of abandoned pasturelands and hedgerows, reclaimed in 2012
Tracy Pond WMA	Peru	2	Timber harvest (Norway spruce plantation removal) on 19 acres completed in 2007
Southeast District			
Noquochoke WMA	Dartmouth	4	Reclaimed in 2010, grassland work ongoing
Frances Crane WMA, North	Falmouth	20	About 80-100 of 470 acres to be completed by June 30, 2015

Frances Crane WMA, South	Falmouth	7	Portions burned or removed in 2013-2015
Quashnet Woods SR/WMA	Mashpee	4	Entire 42 acre site should be harvested before June 1, 2015 on this New England Cottontail restoration effort
Mashpee Pine Barrens, State	Mashpee	8	Extensive mowing/mulching completed in 2013 on this New England Cottontail restoration effort
Mashpee Pine Barrens, Town	Mashpee	7	Extensive mowing/mulching completed in 2013 on this New England Cottontail restoration effort
Camp Cachalot (abuts Myles Standish State Forest)	Plymouth	10	Wildfire in 1964, mowing in 2015
Myles Standish State Forest (abuts Camp Cachalot)	South Carver	20	Between 100-200 acres of this approximately 500 acre harvest completed in winter 2014-2015
Northeast District			
Bill Forward WMA, Kent's Island	Newbury	5	2 in active hayfield, 3 in 1960's
Bill Forward WMA, Canoe Access	Newbury	3	1997-1998
Dunstable Brook WMA	Dunstable	3	Abandoned Fields/Pasture reclaimed in 2010
Valley District			
Leyden WMA, South	Leyden	4	Abandoned pasture reclaimed in 2001
Leyden WMA, North	Leyden	4	Reclaimed meadows and blueberry barrens
Herm Covey WMA	Belchertown	5	Abandoned pasture reclaimed in late 1990
Central District			
Cass Meadows WMA	Athol	6	Abandoned field/pasture reclaimed in 2005 and 2012
Bolton Flats WMA	Bolton/Lancaster	14	Agricultural fields, grasslands
Muddy Brook WCE	Hardwick	10	7 years post harvest
Muddy Brook WMA, Patrill Hollow	Hardwick	20	Some points forested, some points reclaimed in 2014-15
Phillipston WMA	Phillipston	5	Timber harvest 2013
Total		185	

Other Considerations: Contracts may be separately awarded for different sites. Previous survey experience at a particular site may be considered when awarding contracts.

Bidders Conference: None, but bidders are encouraged to visit sites before submitting a bid.

Bid Due Date: Bids must be received by DFW no later than 2:00 pm on **April 17, 2015**

Submission Requirements:

Vendors must submit the completed "Mandatory bid sheet for 2015 breeding bird surveys for the Biodiversity Initiative to.

Benjamin Mazzei
DFW Field Headquarters
1 Rabbit Hill Road
Westborough MA 01581
ben.mazzei@state.ma.us
Phone: (508) 389-6306
Fax: 508-389-7890

Bids submitted in hard copy, email or fax will be accepted. Bids must be received no later than 2:00 pm on **April 17, 2015**.

NOTE: Vendors that are not currently on the Master Service Agreement for “Biological Surveys, Research, and Testing” MUST submit all required Master Service Agreement forms at the time of bid submission. Information regarding the Master Service Agreement for Biological Surveys, Research, and Testing along with all required forms can be found at <http://www.mass.gov/eea/agencies/dfg/dfw/about-masswildlife/biological-surveys.html>

Notice to Proceed: The vendor(s) awarded the contract(s) will receive a Notice to Proceed with information including when surveys may commence, invoicing instructions, lat/long coordinates, other instructions regarding survey points, and bird mapping field forms for each survey point. Microsoft Access data entry forms and associated instructions will be sent on CD.

All work is dependent on availability of funds. If the necessary funds are not available to complete monitoring of all planned sites, DFW reserves the right to eliminate or reduce survey effort.

Survey Methods

Most of the areas planned for surveys this year have been surveyed previously. Some survey points are marked with 1” diameter PVC pipe sticking ~3 feet above ground, except in actively-managed shrubland or grassland habitat. The surveyor will use a GPS or equivalent unit to navigate to the provided lat/long coordinates. If a PVC marker is absent upon arrival at the coordinates of the survey point, the surveyor may be required to supply and place the PVC marker. New PVC markers should be labeled with the appropriate survey point number “Upland Program Pt X” with a permanent marker. Old PVC markers will be re-labeled if the point number is no longer legible and flagging will be tied around the top of all PVC markers.

The bird survey methodology is 10-minute mapping point counts located at each survey point (Ralph et al. 1993). This technique involves the observer placing the location of each detected bird on a map using the species four-letter code and the symbols outlined on the datasheet (Ralph et al. 1993: see mapping field form at the end of this section). Point counts will be 50 meter fixed-radius to allow comparability among widely different habitat types (Petit et al. 1995). However, all birds detected beyond 50 m will also be recorded to allow total detection of species. Only those species observed within the habitat patch should be mapped. A mapping field form with survey point and 50 m buffer overlaying an aerial photo will be supplied for each survey point.

Prior to the actual survey, observers will calibrate their eyes and ears to the 50-m fixed radius. Observers should visit a habitat patch which has vegetation similar to that found in the area to be surveyed. Observers should then mark off 50 m either by pacing or with a meter tape in several locations within the habitat patch. Calling birds should be repeatedly identified and the distance noted. The observer should keep doing this until he/she is confident that he/she can determine if a bird is calling from inside or outside a 50-m fixed radius.

If a bird flees within 50 m of the survey point as the observer is traveling to or from that point, the bird should be recorded as being within 50 m as long as that bird has not been recorded previously. Each individual bird detected will be recorded as male, female, or unknown. Birds can be detected visually, by call, or by song. Birds that were only seen flying over the point and did not take off from or land within 50 meters will be recorded separately. Known locations of nests should also be mapped.

Additionally, if a bird that was initially mapped outside the 50 m fixed-radius flies to within 50 m of the survey point during the recording period, this bird should be recorded as being within 50 m of the survey point on the point count data form. Flyovers by definition are recorded as beyond 50 meters (even if the bird flies directly overhead) with the exception of swifts and swallows. If a swift or swallow is detected flying over, it is recorded as within or beyond 50 meters based on the actual bird location.

The observer will transfer the data from the mapping form to a point count data form **immediately upon returning from the field**. More than one individual can be recorded per line. For example, if 3 male indigo buntings were heard singing < 50 m from the survey point, they would all be recorded on the same line (see sample datasheet below).

EQUIPMENT NEEDED

Field guides	Checklist of Birds	Thermometer
Data sheets	Binoculars	GPS unit
Pencil or waterproof pen	Flagging	1" PVC (maybe)

TIMING OF COUNTS

Surveys will be conducted three times during the breeding season. The surveys will be completed from May 25 – June 30, 2015, and should be separated by **at least 5 days with a longer separation between replicates preferred**. The starting point and path among points will differ for all three replicates to minimize effects of visitation path on survey results. Counts will begin no earlier than 30 minutes before sunrise and end no later than 0900 hours or before the temperature reaches 21° C (70° F).

WEATHER

Breeding Bird Survey (BBS) acceptable weather guidelines will be followed (USGS & CWS 1998). Surveys will be conducted under satisfactory weather conditions: good visibility, little or no precipitation, and light winds. Occasional light drizzle or a very brief shower may not affect bird activity, but fog, steady drizzle, or prolonged rain will be avoided. Counts will be made during mornings when the wind is less than 8-mph. Wind speed can be estimated by observing surrounding woody vegetation. If the tips of small twigs are swaying constantly, winds are generally greater than 8 mph. If small twigs are swaying intermittently, surveys can take place.

RECORDED DATA - See sample map and datasheet in Appendix I for an example of how to record data. (if no data can be recorded, fill in the blank with “NA” – not applicable):

Project Site – name of the site where survey is taking place.

Survey Point - the number of the point at which the count is taking place (see appropriate site map for survey point designations). Note that when the survey point number is later entered in the MS Access database, it will be entered in a 2-digit format, i.e. “01” for point 1.

Replicate Number - number 1-3 representing the replicate of the season.

Observer - person conducting the point counts.

Date - date upon which the point count was conducted in the form MM-DD-YYYY

Temperature - temperature in degrees **Celsius** at the start of the point count.

Sky Conditions - Record one of the following codes:

0	Clear sky, few clouds
1	Partly cloudy (scattered) or variable sky
2	Cloudy (broken) or overcast
3	Rain
4	Fog or smoke
5	Snow
6	Showers (intermittent rain)

Wind Speed - enter one of the following Beaufort Numbers, not mph:

Beaufort #	Wind Speed (MPH)	Indicators of Wind Speed
0	< 1	Smoke rises vertically
1	1-3	Wind direction shown by smoke drift
2	4-7	Wind felt on face; leaves rustle
3	8-12	Leaves and small twigs in constant motion
4	13-18	Raises dust and loose paper; small branches move
5	19-24	Small trees in leaf sway; crested wavelets on water

Species - the four-letter Bird Banding Lab species code for each species detected

(<http://infohost.nmt.edu/~shipman/z/nom/bbl.html>). The standard code format for a bird with a 2-word common name is the first two letters of the first word followed by the first two letters of the second name (e.g. Eastern Bluebird, EABL), but there are exceptions when multiple species would have the same code.

Commonly detected species with non-standard codes include:

CEDW	Cedar Waxwing	TRES	Tree Swallow
PRAW	Prairie Warbler	YWAR	Yellow Warbler
SAVS	Savannah Sparrow	BARS	Barn Swallow

Number of Males w/in 50m - number of males of each species found within the 50-m radius circle and how they were detected [song, call, visual, or flyover (swifts/swallows only)].

Number of Females w/in 50 m - number of females of each species found within the 50m-radius circle and how they were detected [song, call, visual, or flyover (swifts/swallows only)].

Number of Unknown Sex w/in 50 m - number of birds of unknown sex of each species found within the 50m-radius circle and how they were detected [song, call, visual, or flyover (swifts/swallows only)].

Number of Males beyond 50m - number of males of each species found beyond the 50m-radius circle and how they were detected (song, call, visual, or flyover).

Number of Females beyond 50 m - number of females of each species found beyond the 50m-radius circle and how they were detected (song, call, visual, or flyover).

Number of Unknown Sex beyond 50 m - number of birds of unknown sex of each species found beyond the 50m-radius circle and how they were detected (song, call, visual, or flyover).

DATA SUBMISSION AND SUMMARY REPORT

All data and summaries must be received by DFW by **July 30, 2015**. Hard copies of mapping field forms will be submitted. Point count field data will be **submitted electronically using a provided Microsoft Access database** using the entry form (Figure 7). All data for all sites surveyed will be submitted in one Access database file. DFW recommends that surveyors examine the Access data entry form prior to field surveys to facilitate later data entry. The Upland Program reserves the right to require the contractor to come to DFW Field Headquarters in Westborough to resolve issues that may arise with data entry and/or submission requirements. Payment will not be made until data summaries have been received.

Upon completion of the bird surveys, compile a summary of observations made at, and while traveling between, survey points (usually < 1 page) and briefly discuss the following items:

1. Legally-protected species encountered including survey point where observed. If a protected species is encountered, the vendor must complete a NHESP Rare Animal Observation form. These forms can be found at http://www.state.ma.us/dfwele/dfw/nhesp/anml_obs.htm
2. Occurrence of additional bird species not recorded in the survey
3. Other unusual/interesting observations.
4. Problems/issues encountered during the survey especially those associated with survey protocol.

Upland Program Database - [tblBirdSurveyDetails]

File Edit View Insert Format Records Tools Window Help Adobe PDF

Type a question for help

MS Sans Serif 8 B I U

Add New Record Next Record Previous Record Record Additional Species Observed at Site DataEntryBy: DataEntryDate: 3/15/2006 2:17:31 PM

SiteID: SurveyPoint#: SurveyPointID: Replicate: Observer: SampleDate: Year: SampleID: Sky: Wind: Temp(C):

Point Replicate

BirdSample

In Plot?	Species	Common Name	Sex	Number	IDBy	Nesting?	Notes
Yes				1		No	

Notes:

Record: 1 of 1

Form View NUM

Start Inb... Dat... Micr... mon... taco... Con... Mai... tblB... 2:17 PM

Figure 7. Access data entry form for bird data.

Literature Cited

- Petit, D.R., L.J. Petit, V.A. Saab, and T.E. Martin. 1995. Fixed-radius points counts in forest: factors influencing effectiveness and efficiency. Pages 49-56 in C.J. Ralph, J.R. Sauer, and S. Droege (tech. eds.). Monitoring bird populations by point counts. USFS Gen. Tech. Rep. PSW-GTR-149.
- Ralph, C.J., G.R. Geupel, P. Pyle, T.E. Martin, and D.F. DeSante. 1993. Handbook of field methods for monitoring landbirds. USFS Gen. Tech. Rep. PSW-GTR-144.
- USGS and CWS. 1998. Instructions for conducting North American Breeding Bird Survey. USGS Patuxent Wildl. Res. Cent., Laurel, MD and Canadian Wildlife Service, National Wildl. Res. Cent., Quebec. 6pp.

Mandatory bid sheet for the 2015 Breeding Bird Surveys for the Biodiversity Initiative

Instructions: You may bid on any or all of the survey sites. Enter your total cost which should include all expenses (labor, travel, 3 rounds of surveys at each point, and all of the data entry as required above) associated with each particular survey.

Site	Town	# of Survey Points	Cost (includes 3 ten minute counts at each point and all data entry)
Western District			
Fox Den WMA	Worthington	4	
Stafford Hill WMA, Barn	Cheshire	5	
Eugene Moran WMA	Windsor	7	
Tracy Pond WMA	Peru	2	
Farmington River WMA	Otis	8	
Southeast District			
Noquochoke WMA	Dartmouth	4	
Frances Crane WMA, South	Falmouth	7	
Frances Crane WMA, North	Falmouth	20	
Camp Cachalot	Plymouth	10	
Myles Standish State Forest	South Carver	20	
Quashnet Woods SR/WMA	Mashpee	4	
Mashpee Pine Barrens, State	Mashpee	8	
Mashpee Pine Barrens, Town	Mashpee	7	
Northeast District			
Bill Forward WMA, Kent's Island	Newbury	5	
Bill Forward WMA, Canoe	Newbury	3	
Dunstable Brook WMA	Dunstable	3	
Valley District			
Leyden WMA, North	Leyden	6	
Leyden WMA, South	Leyden	4	
Herm Covey WMA	Belchertown	5	
Central District			
Cass Meadows WMA	Athol	6	
Bolton Flats WMA	Bolton/Lancaster	14	
Phillipston WMA	Phillipston	5	
Muddy Brook WMA, Patrill Hollow	Hardwick	20	
Muddy Brook WCE	Hardwick	10	

Bidder's Information:

Signature		Date	
Name (printed)		Phone	
Street Address		Email	
City, State, Zip Code		FAX	

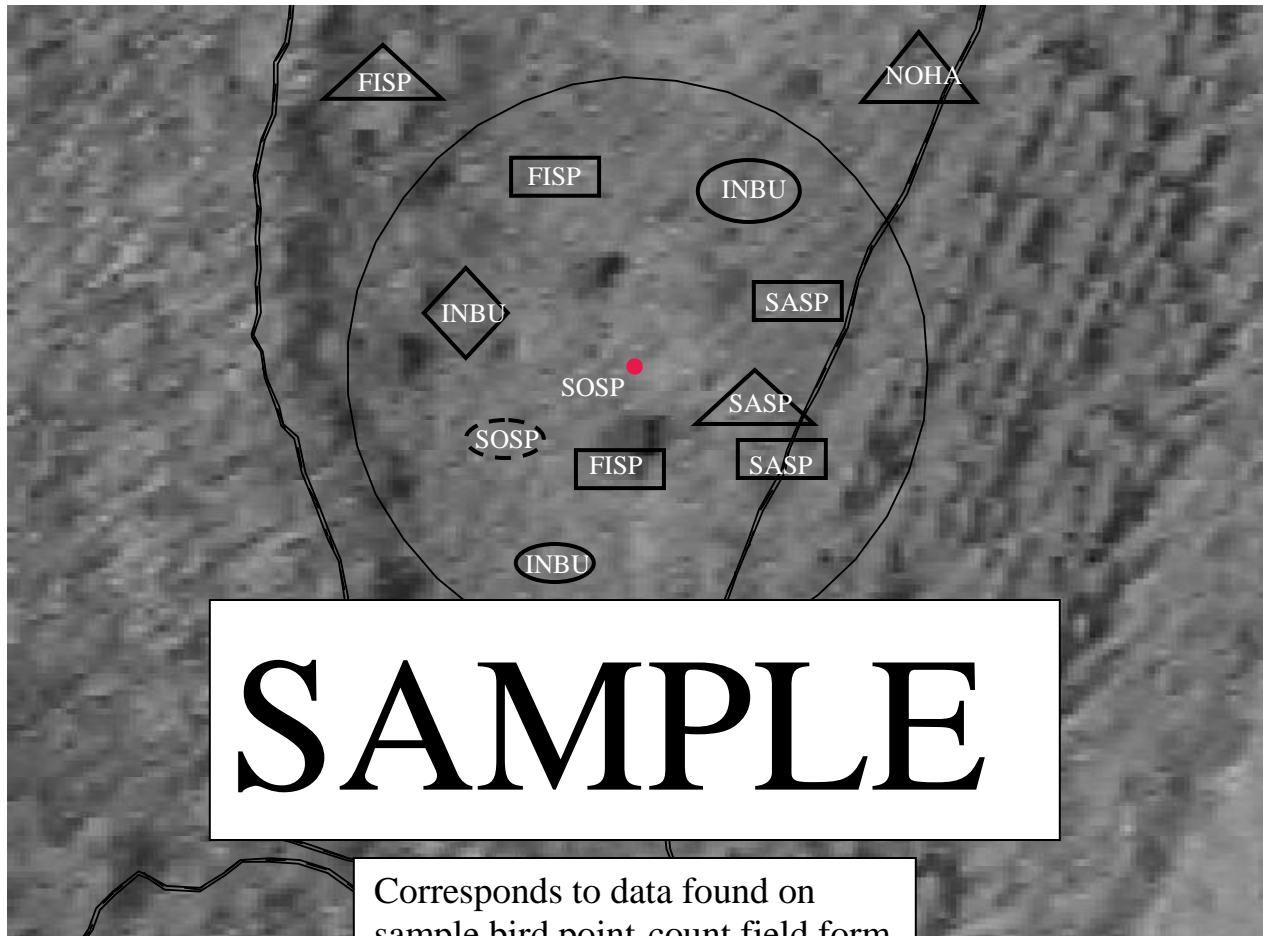
Signature conveys approval with all proposed bids and agreement with all terms set out in this Scope of Services

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Biodiversity Initiative Bird Mapping Field Form

Project Site: TACONIC TRAIL Survey Point: 2 Replicate: _____

Sky (0-8): _____ Wind (0-5): _____ Temp: _____ C



20 0 20 40 60 80 100 Meters

50 m buffer
Reclaimed Areas
Survey Points



MAPPING SYMBOLS		
CODE		
S		Position of singing male
S		Approximate position of singing male
S		Simultaneous song of 2 males
S		Known change in position
S		Assumed change in position
CODE		
M		Male observed
F		Female observed
C		Calling, sex unknown
P		Pair together assumed

Biodiversity Initiative Bird Point-count Field Form

Project Site:

Survey Point:

Replicate #:

Observer:

Date mm/dd/yyyy:

				/ /
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Sky (0-8):

Wind (0-5):

Temperature:

		°C
--	--	----

S = ID by Song, **V** = ID by Visual, **C** = ID by Call. **FO** = Fly over, * = Nesting.

Song takes priority over call. Visual takes priority over song.

[illegible]

Biodiversity Initiative Bird Point-count Field Form

Project Site: _____

Survey Point: _____

Replicate #: _____

Observer: _____

Date mm/dd/yyyy: _____

Taconic Trail	1	1	J.J. JONES	06/05/2004
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Sky (0-8):

Wind (0-5):

Temperature:

0	1	23 °C
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S = ID by Song, **V** = ID by Visual, **C** = ID by Call. **FO** = Fly over, * = Nesting.
Song takes priority over call. Visual takes priority over song.

[illegible]

Appendix II. Directions to Biodiversity Initiative sites

NORTHEAST DISTRICT SITES

Dunstable Brook WMA, Dunstable

From I-495

Take exit 35c and go north on Route 3 for ~7 miles. Take exit 34 and head south onto Westford Road. Make a right onto Dunstable Road and follow for ~ 1.3 miles. Look for the WMA on your left.

William (Bill) Forward WMA, Newbury, MA

From the west on I-495

Take exit 55, Rt 110 and follow the signs toward I-95 south/Boston. Merge onto I-95 south. Take exit 55 and go east on Central St. In 1.2 miles, veer left on School St. In 0.4 miles, turn left on Elm St. Elm St ends at Rt 1. Go left on Rt 1 for ~1/2 mile. The Bill Forward **Canoe Access** entrance is on the right, just before Rt 1 crosses the Parker River and salt marsh. For **Kent's Island**, continue ~1.2 miles north along Rt 1 across the Parker River. Turn right on Boston Road, and in ~1/4 mile veer right on Hay Road. In ~1/2 mile, Hay Road curves left, and the access road across the salt marsh to Kent's Island is straight ahead.

From the MassPike west of Boston

Take exit 14, I-95 north. Take exit 50 from I-95 onto Rt 1 north toward Topsfield. Follow Rt 1 for ~12 miles. The Bill Forward **Canoe Access** entrance is on the right, just before Rt 1 crosses the Parker River and salt marsh. For **Kent's Island**, continue ~1.2 miles north along Rt 1 across the Parker River. Turn right on Boston Road, and in ~1/4 mile veer right on Hay Road. In ~1/2 mile, Hay Road curves left, and the access road across the salt marsh to Kent's Island is straight ahead.

SOUTHEAST DISTRICT SITES

Noquochoke WMA, Dartmouth

From New Bedford Area

Take I-195 to exit 11, and then proceed north on Reed Rd. for 1.5 miles to the intersection with Hixville Rd. Go approximately 7/10 mile on Hixville Rd. The entrance to the WMA will be on your right shortly after crossing Shingle Island River.

Frances Crane WMA North, Falmouth

From Route 25, head east on Rt 151 towards Mashpee. Look for Hamilton tree Service on your left, and immediately after the entrance to the Frances Crane Field Trial Parking Area, also on your left (just before the town softball field).

Frances Crane WMA South, Falmouth

Head east on Rt 151. Turn right at the first set of stoplights which mark Sandwich Road. In about ½ mile, shortly after passing the power line, veer left onto Hayway Road. Follow Hayway for <1 mile; the parking area will be on your left

Camp Cachalot, Plymouth

From the West, New Bedford/Fall River: Take I-195 East to Route I-495 North. Take I-495 North to Route 58 North then follow instructions below.

From the North, Taunton: Take I-495 South to Route 58 North, then follow instructions below.

From the South, Cape & The Islands: Take 495 North to Route 58 North to South Carver, then follow instructions below.

Continue straight ahead when Route 58 veers to the left. Travel thru South Carver and turn right onto Cranberry Road and continue into Myles Standish State Forest. At Forest Headquarters follow the detour signs that continue a circle around the bridge area and then follow the signs towards Fearing Pond and Camp Cachalot. The road to Camp Cachalot is the next right after Charge Pond Road.

Myles Standish, South Carver

Take 495 South until Exit 2, 58 North towards Carver/Plymouth. Take 58 North. Continue onto Tremont Street. Turn right onto Cranberry Rd.

Quashnet Woods, Mashpee

South on I-495 over the Bourne Bridge, then south on Rt. 28. Take exit for Rt. 151, drive east on Rt. 151 then take right onto Old Barnstable Road. After about ½ mile, turn left onto Turner Road to powerline right-of-way. Do not block the gate!

Mashpee Pine Barrens, State

South on I-495 over the Bourne Bridge, then south on Rt. 28. Take exit for Rt. 151, drive east on Rt. 151 to the Mashpee rotary. Take the second exit of the rotary onto Great Neck Road, follow for approximately 1 mile then turn right onto Mercantile Road. Take immediate left onto dirt road (Great Hay Road). Follow Great Hay Road about 1 mile to 4 way intersection (Holland Mills Road). State land exists south of Holland Mills Road and east of Great Hay Road. Do not block the road as it is a public way.

Mashpee Pine Barrens, Town

South on I-495 over the Bourne Bridge, then south on Rt. 28. Take exit for Rt. 151, drive east on Rt. 151 to the Mashpee rotary. Take the second exit of the rotary onto Great Neck Road, follow for approximately 1 mile then turn right onto Mercantile Road. Take immediate left onto dirt road (Great Hay Road). Follow Great Hay Road about ¾ of a mile. Treatment areas exist on both sides of Great Hay Road. Do not block the road as it is a public way.

WESTERN DISTRICT SITES

Farmington River, Otis

Travel I-90 west to exit 2 (Lee). Turn left at light coming off the exit onto Rt. 20 (east), then straight through the next set of lights. Follow Rt. 20 east for approximately 10 miles, then turn right onto Johnson Road. Follow Johnson Road for approximately 2 miles just past the intersection with Lee-Westfield Road to open log landing.

Fox Den, WMA, Worthington, Middlefield

From the MassPike (I-90) Exit 3:

Exit right (south) onto Rt 10/US-202/Southampton Rd. Turn right onto US-20/Franklin St in Westfield. Turn right onto Rt 112 in Huntington. Cross the river and immediately take a sharp left on Fisk Ave. In ~1.5 miles, veer right on Chester Hill Rd/Skyline Trail. Chester Hill Rd will become Main Rd/Skyline Trail. In Middlefield Center, turn right on Bell Rd. At the T-intersection, turn left on Arthur Pease Rd. In ~0.25 miles, turn right on Root Rd. At the T-intersection, turn left on Chipman Rd. The WMA boundary is about 1.5 miles.

Eugene Moran WMA, Windsor

From the intersection of Rt. 9 and Rt. 8A in Windsor, MA, head north on Rt. 8A for about one mile to a large parking area on your right. Go just past this large parking area to the intersection of the Fobes Hill access road and Rt. 9. Park here, and walk up Fobes Hill access road.

Stafford Hill WMA, Barn Area, Cheshire

From Route 9:

Take route 9 to the intersection of MA-8. Make a right onto MA-8/Savoy Rd. Make a left onto MA-116. Take a left onto Fales Rd and follow for ~1 mile. Make a left onto Sandmill Rd and bear right to stay on Sandmill Rd. Make a right onto Stafford Hill Rd. There is a parking area 2 miles down the road on the left near an abandoned barn.

Tracy Pond WMA

From Route 9:

Take route 9 to intersection with MA-8 South in Dalton. Make a left onto MA-8S. After 0.8 miles, bear right to stay on MA-8 S. Continue 3.8 miles and take a slight left onto Middlefield Rd/Skyline Trail. Continue 3.2 miles to a pull-off and gate directly across from South Road in Peru.

CENTRAL DISTRICT SITES

Cass Meadows, Millers River WMA, Athol

From Route 2 east of Athol

Exit off of route 2 at exit 18 and travel north on route 2A. Route 2A and route 32 join for several miles, but split in Athol. Go into town via route 2A. For the main part of the WMA, take a right on Exchange Ave., which is in downtown Athol. Go over the river and turn left on Pequog Ave. A gated road which leads into the area will be on your left about a 1/4 mile up the road. For the parcel on the south side of the river, continue west past Exchange Ave and turn right into a city park parking lot on the right side of the road just before you cross the Millers River.

From Routes 202/2 west of Athol

Where 202 and 2 split in the town of Orange, go north on Daniel Shayes Hwy. to route 2A. Route 2A will take you to Athol. For the parcel on the south side of the river, turn left into the city park parking lot on the left side of the road just after you cross the Millers River. For the main part of the WMA north of the river, turn left on Exchange Ave which is in downtown Athol. Cross the river and turn left on Pequog Ave. A gated road which leads into the area will be on your left about a 1/4 mile up the road.

Bolton Flats WMA, Bolton/Lancaster

From Route 495

Take exit 27 towards Bolton. Merge onto MA 117/West Main Street. Turn right on MA-110 East/Still River Rd. The parking area is off of Still River Road.

Muddy Brook WMA, Patrill Hollow

The bridge that spans Muddy Brook on Patrill Hollow Road can be walked but not driven. Take 32A North to the center of Hardwick. Take a Left onto Greenwich Road and then a Left onto Patrill Hollow Road. Bare right at the “Y” to stay on Patrill Hollow Road. Follow until you get to the bridge across Muddy Brook.

Muddy Brook WCE, Hardwick

From Hardwick center head West on Greenwich Rd. Continue on Greenwich Rd passing Patril Hollow Rd which will be on your left, for approximately 0.5 miles. Turn left onto Muddy Brook Rd. Continue on Muddy Brook Rd for 0.5 miles to abandoned log landing at the bottom of the hill on your left. The abandoned log landing occurs after the last house on the road and beyond a sign that indicates the road ends ahead.

Phillipston WMA, Phillipston

From Rte. 101 in the center of Templeton, head south on 101, crossing the town line into Phillipston, go past Queen Lake on your right, and continue for 0.1 miles to Phillipston WMA parking area on your left.

VALLEY DISTRICT SITES

Herm Covey WMA, Belchertown, MA

From I-90

Turn off of I-90 at exit 8 (Route 32). At the end of the exit take a right onto Route 32, and immediately take the next right onto Lawrence St. Take Lawrence St. to Shearer St. and turn left. Take Shearer St. to Route 181 and turn right (north). About 1 mile north of the Palmer/Belchertown line, turn right onto Michael Sears Rd. In about 1 mile, turn right onto Spring Rd., then make the next left onto East St. About 3/4 mile up the road, the Division's Connecticut Valley District office will be on the right and the entrance to the WMA will be on the left.

From Route 2

Take 202 south. About 21 miles from the Route 2/202 intersection, take a left onto Route 9 in Belchertown. About 4 miles down and about 1/2 mile past the sign for Quabbin Reservoir's Winsor Dam, turn right onto East Rd. About 1.5 miles down you will see the Division's Connecticut Valley District office on the left and the gated entrance to the WMA on the right.

Leyden WMA, South, Leyden

From Route 2

Exit onto Route 5 north, which is the exit just before the junction of route 2 and I-91.

To access **Leyden WMA – South**, continue north about 2.5 miles and take a left on Log Plain Rd. At the stop sign take a left on Barton Rd. Go about 1.5 miles and take a right on Oak Hill Rd. (not Oak Hill Acres, which is just before it). This will lead you into the WMA and a parking area on your right.

Leyden WMA, North, Leyden

From I-90

Take exit 28 from I-91, head west on Route 10. Take a left onto Route 5 & 10 South and follow for ~2 miles. Look for West Mountain Rd on your right (if you go over the bridge you have gone too far). Take a right onto Mountain Rd which becomes Eden Trail Rd. Follow Eden Trail Rd for ~6.5 miles. Make a left onto Eden Rd at the hay fields and then immediately left onto East Glen Rd. As soon as you make the left onto East Glen Rd look for the parking area on your left.